JULY 1982

DRIVER

SAFETY'S FUTURE?

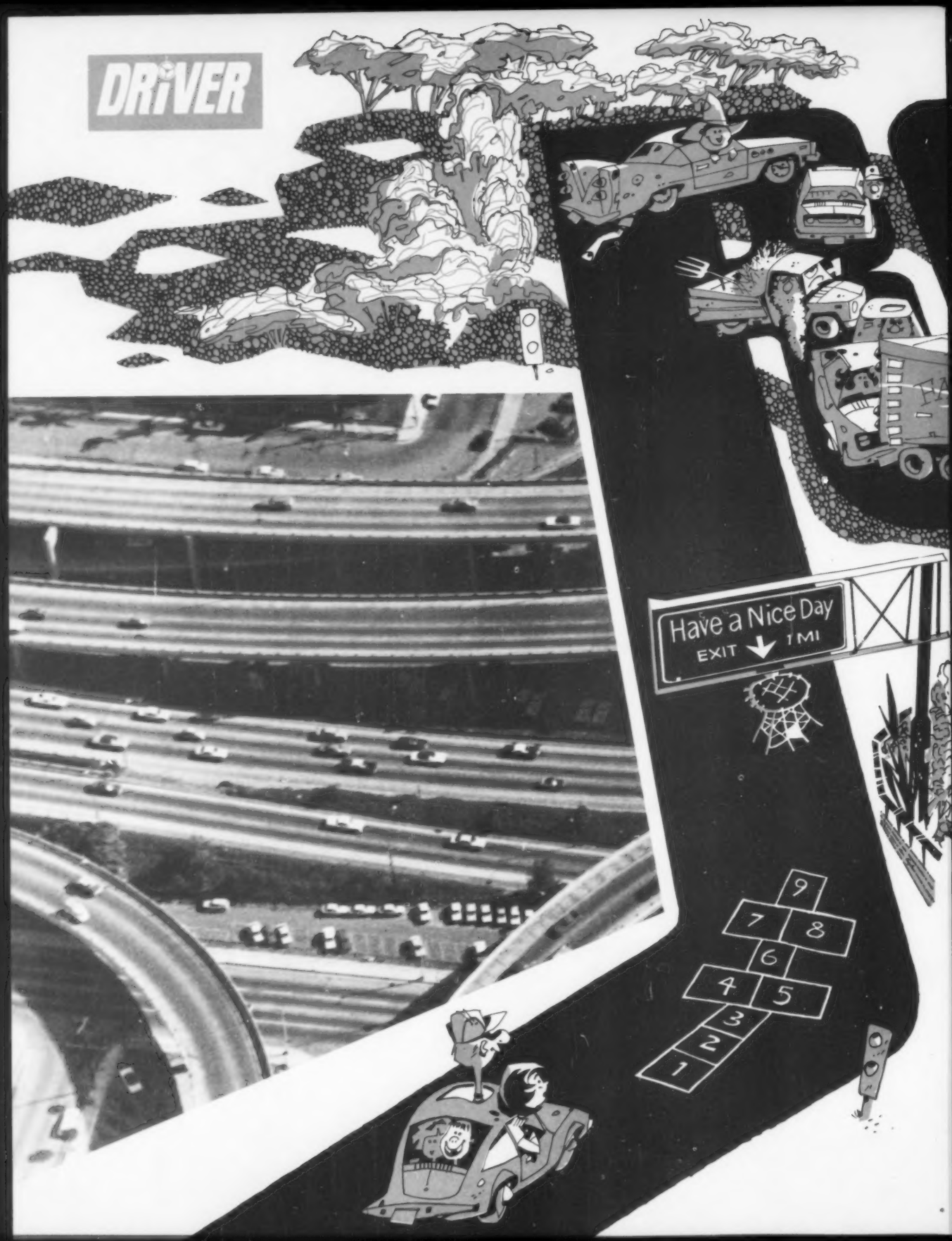
Drunk Driving Laws

The $15,455 Difference

The Backyard Mechanic

how to win at

ROAD GAMES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Have a Nice Day
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Parents are often forced to invent games for their children to do, especially during the summer months when the family goes on a long vacation. That's because the drive is boring for the kids and they need something to keep them from fighting or distracting Mom and Dad.

Strangely enough, the drivers themselves need some games they can play as they drive. And for some of the same reasons — to keep them from getting bored or distracted from that most vital job, the safe operation of their automobiles.

So we here present some DRIVER Magazine "Road Games" for the purpose of keeping you alert in your auto — in town or out. We have suggested scoring for these games, but we think a passenger should keep the scorecard for you and you should keep both your hands on the wheel and your mind on the road. Got the idea? Go to it!

"REDLIGHT/GREENLIGHT"

"Redlight/Greenlight" is played, obviously, where there are intersections with traffic lights. The idea is to make a smooth, efficient stop. You must ask yourself a couple of questions as you approach an intersection: How long has the green light been on? Will it turn red before I get there? Once you've made the decision that you won't get through the intersection before the red, you're ready to play the game.

First, slow your car before you get to the intersection. Ease your foot off the accelerator pedal and let the car slow. Score yourself three points for each five miles per hour you slow *before* you hit the brakes. Give yourself five bonus points for each yellow light you don't run through.

continued

"Redlight/Greenlight" The light is green and I'll get through the intersection, you say. Ah, but will you? See how many cars are stacked up on the cross streets and how few are ahead of you at the intersection. Ease up on the gas and prepare to stop. You can get stopped more smoothly, and score a few points, by not jumping on the brakes.

DRIVER

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FOR THE MILITARY DRIVER

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THE EDITOR SPEAKS

DOUBLE CLUTCH

SMALL CARS/YOUNG DRIVERS

If you're a regular reader, you've seen many articles in DRIVER about the insurance industry's contention that small cars are involved in more accidents with injury claims than large cars because small cars are inherently less safe.

Now someone has come along with a different interpretation. J.B. Innes, Jr., an executive of one of the nation's largest fleet and leasing companies, says it is the driver's age, not the size of the car, that is responsible for the frequency of accident injury claims. Safety depends far more on the driver than on the car, says Mr. Innes. ("Amen to that," say we.)

To illustrate his point, he compares accident figures for different body styles of the same car, the Chrysler K cars. Two-doors, four-doors and wagons have the same wheel-base, same body structure, same braking system, same tires and almost identical weight and mass. But a very different accident rate for the different body styles. He says that youthful purchasers (16 to 24) prefer two-door versions and therefore the coupes have a worse accident record than the four-door or wagon models of the same car (roughly a 36-percent difference). He says GM's X-cars can be compared with the same results.

Innes claims he can prove a precise correlation between the percent of youthful purchasers and accident frequency. He concludes that the way to improve our accident experience is simply to get drunks and teenagers off the road. We're left wondering how all those teenagers can afford those new cars.

road games

continued

"Parkers" The classic "Parkers" situation! A person opens a car door without looking to see if you are approaching. If you saw her in the car you get a point. If you successfully avoid taking her and her door for a ride on your hood, you get three more points. This is a fun game, but it takes planning to provide yourself an escape route.

"PARKERS"

This is a real "heads-up" game that involves watching and dodging. What you're watching are cars parked at the curb, and what you're dodging are open car doors. First, look at the parked cars as you pass them. How wide are their doors compared to the space between your car and them? If, as is usually the case, there's not enough room for your car and an open door, you're ready to play.

To play "Parkers," glance into each car as you approach it. Is there a person behind the wheel? If so, is he or she planning to get out? Now, watch the traffic around you, to your left, approaching and behind you. Look for a way out if the person opens the door. Keep your speed down. Score one point for each person you see in a parked car to your right, whether or not that person gets out. And give yourself three points for every opened car door that you *don't* hit.

"Peek-A-Boo" This game is played with the understanding that what you see in your mirrors is not all the information you need for safe motoring. The mirror shows three cars that are more or less close, but you have to look over your shoulders to make sure. If you see any more than the mirrors show, you get three points each. What could be easier?

"PEEK-A-BOO!"

"Peek-A-Boo!" is also known by an alternate name "Who's that hiding from my mirror?" It is based on the common driving problem known as the "blind spot." The blind spot is that area behind you that neither the interior nor the door mirrors show to you. The blind spot is large enough to hide an entire car, which makes it dangerous for those who never look

continued

over their shoulders before changing lanes or turning.

Play is very simple. Look in all your mirrors and count the number of cars you can see. Then glance over your left or right shoulder (depending on the direction you plan to move) and watch for cars. Score three points for every car you see that wasn't shown in any mirror. Give yourself five bonus points for each time you signal for the lane change, whether or not anyone is close enough that you would interfere with them.

"Safe Zone" Are you far enough behind this sportscar? If not, you'll miss a few points. Since you can't count the number of feet or car lengths between, you can play "Safe Zone" by counting two seconds after the sportscar passes a stationary object. You should pass that same object no sooner than two seconds and then you score a point.

"Oh, That Motorcycle." Watch yourself here! You've already missed a point for not seeing that motorcycle. Now if you avoid hitting it, you'll get the five bonus points for not taking his right of way. Motorcycles are not hard to see; you just have to train yourself.

"SAFE ZONE"

"Safe Zone" is a game that answers a couple of questions that you can't otherwise answer. The first is "How close are you to running into the car ahead?" and the other is "Can you count the number of feet in between?" If you could answer those questions the game could be different. But as it is, the rules are as follows.

First, follow another car on the highway. To set up your safe zone, watch carefully as the car ahead passes some stationary object, like a tree or a sign or a crack in the pavement. Count off two seconds like this "one-thousand-and-one, one-thousand-and-two." Don't pass that same object until you finish saying the word "two." Now, give yourself one point for each time you get the word "two" out without rushing. If you keep playing and try to maintain that same "Safe Zone" you can pile up a lot of points. By the way, the two-second "Zone" works no matter what speed you're traveling.

"OH, *THAT* MOTORCYCLE"

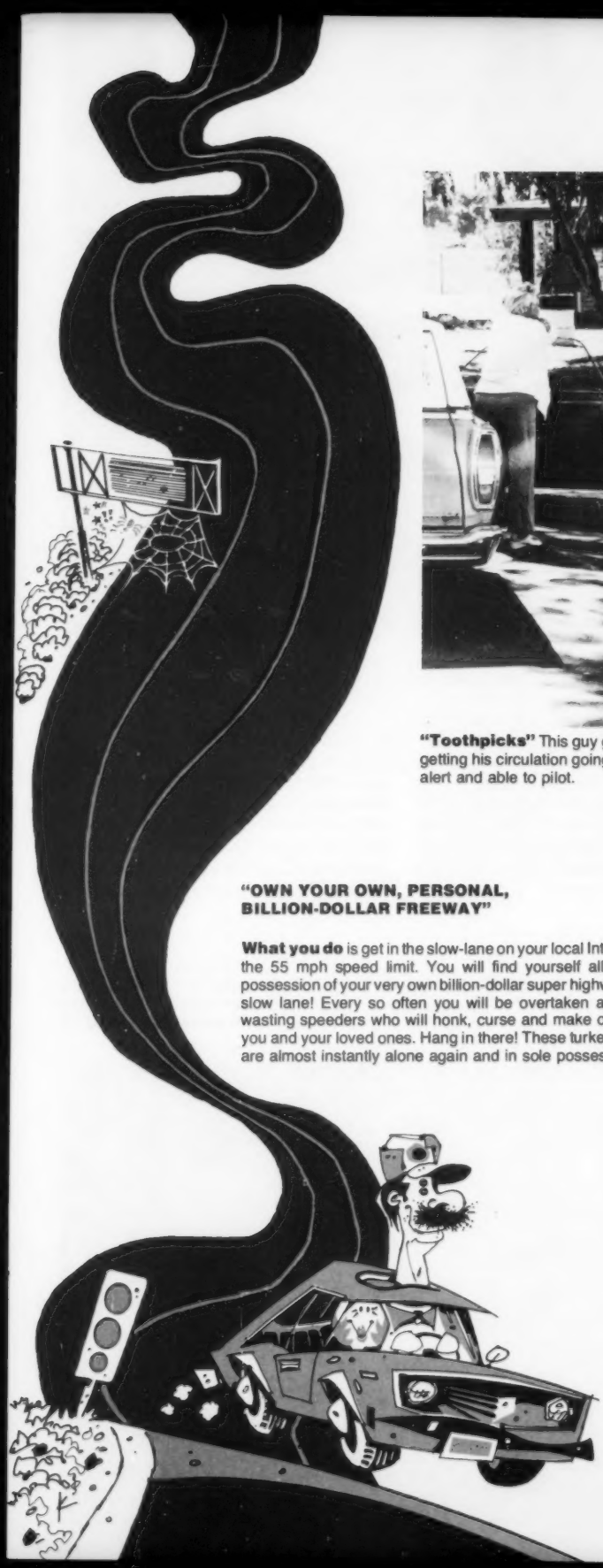
If there's anything on the road more overlooked than the motorcycle, we don't know what it is. Compared to an automobile a motorcycle is very vulnerable, and so this overlooking is dangerous to the cycle rider. "Oh, *That* Motorcycle" involves two things — recognizing motorcycles and avoding motorcycles.

Watch for motorcycles on the streets and highways. You will see many more than you expect. Score a point for every motorcycle you see, whether it is going alongside you, in opposing traffic or in cross traffic. Be careful, especially at night. That headlight that looks like a car with one lamp burned out may be a cycle. Give yourself an extra five points each time you give the right of way to a motorcycle by not turning in front

"Toothpicks" This guy gets three points. He has stopped for the sole purpose of stretching and getting his circulation going. Hopefully, he'll do this at least every couple of hours, keeping himself alert and able to pilot.

"OWN YOUR OWN, PERSONAL, BILLION-DOLLAR FREEWAY"

What you do is get in the slow-lane on your local Interstate and observe the 55 mph speed limit. You will find yourself all alone and in sole possession of your very own billion-dollar super highway. But keep in that slow lane! Every so often you will be overtaken and passed by fuel-wasting speeders who will honk, curse and make obscene gestures at you and your loved ones. Hang in there! These turkeys go by so fast you are almost instantly alone again and in sole possession of your prize.



of it or by allowing it to turn without hitting it.

"TOOTHPICKS"

This game has nothing to do with toothpicks, aside from the old joke "He was so tired he needed toothpicks to hold his eyes open." The idea is to substitute some real action for the figurative toothpicks. If you're tired, you can't safely operate a car. These things apply more readily to long trips, but the first one can apply to any trip.

When you get into the car to go anywhere, give yourself five points if you are starting out rested. If not, get out and go take a nap. (We don't deduct points; that's counter-productive.) Add two points for getting out and stretching and walking around when you stop for gas or food. Add three points for each time you stop just to get out and get your circulation going, or to get coffee. You get five bonus points for not driving longer than eight hours, including the stops for rest, food or fuel.

continued

"Scope It Out" Put yourself in the place of a driver at this intersection. Take in the scene with quick eye movements. Watch the oncoming traffic as you prepare to run. Watch the opposing driver who is turning in front of you. Watch the lights to see when they are turning red. A lot to watch, isn't there?

"SCOPE IT OUT"

"Scope It Out" involves something drivers like to do, but do the wrong way — rubbernecking. The usual method is looking at the girls (or guys) in other cars, checking out the cars themselves, or looking at such things as store windows and billboards. The trouble is, this has nothing to do with driving and the person doing the looking is doing too much movement. Let your eyes do the moving, and look at only those things that affect your driving.

Any motoring situation will do. If you're in town, watch the street signs, the lights, the other cars, anything that might dictate some action by you and anything that might present a hazard. But do it by keeping your eyes moving all the time, and not with turns of the head when it isn't necessary. This game can be played along with many of the other games, so scoring can be a bit tricky. Try giving yourself one point for each mile you travel without unnecessary head movements. And two bonus points for each attractive member of the opposite sex that you ignore in favor of watching what you're doing.

"DETECTIVE"

This is a game of deductive reasoning, but you don't need to be a Sherlock Holmes to play. Some good, common sense is the only requirement. "Detective" points out that most unexpected hazards you encounter while driving need not be unexpected. For instance, when you drive down a residential street, what can you expect to see with little or no warning? Cars backing out of driveways. Children chasing balls, dogs or

"Detective" There really aren't that many unforeseen hazards. See if you can count a few here. The truck waiting for a left turn? Maybe he'll turn in front of you. The kids on the bikes? Maybe they'll stray into your path or even play 'chicken.' One point for each of those. No points for wondering if a palm tree will fall into your path.

continued

other children. Stop signs hidden by thick bushes or low-hanging branches.

Always take the driving situation in which you are presently involved. In the business section of town, look around and ask yourself, "What could happen here?" and chalk up one point for each supposedly unexpected problem you think of. Then, if one of these *does* happen, and you avoid any collision or difficulty, give yourself five bonus points. If you thought that pedestrian on the corner might run across just before your light turned green and he did, give yourself the five bonus points. Unless you hit him, of course.

"STEADY AS SHE GOES"

The best position to be while driving is in the center of your lane of traffic, in most cases. "Steady As She Goes" is a game built around smooth and careful tracking. Many people play the game by constantly judging their position in relation to the dotted lines between lanes or in relation to the line or the edge of the road on the outside lanes. They may weave somewhat in their lane, and they are usually closer to one side than the other.

Correct play involves sighting ahead of you. You watch the road some distance ahead of your car, sighting along an imaginary line in the center of the lane. Your steering will automatically follow that line and you will be centered. You get a point for each mile of smooth, straight-ahead driving you can do.

"PRE-FLIGHT"

"Pre-Flight" is a fun game for those who like to pretend they are pilots, because it involves making a checklist in preparation to "taking off." Most people insert the key in the ignition and move, with no thought to whether everything in their machine is working correctly. When you get into your car, ask yourself, "Is everything operating in this car? Am I ready to go?"

The following are some scoring suggestions, just to get you started. Give yourself two points each for checking the mirrors, the turn signals, the lights, the seat adjustment, including the headrests, perhaps the horn, and certainly whether or not the doors are closed. Five bonus points go for insuring that all passengers in the car are buckled into belts or child seats, and a further five bonus points for checking around the car and behind it before you start to move.

"Pre-Flight" Not bad at all! He's already got the five bonus points for having the belt fastened, and he's getting two more points for adjusting the seat. Now if he checks the mirrors, turn signals and all the other controls — and also closes his door — he'll really be in the points.

"Steady As She Goes" See how well you can play this one? You're right in the center of the lane! Keep that up for a mile and you get a point! The best way to make sure of your position is to follow an imaginary line in the center of the lane some distance in front of your car. If you judge by the dotted lines or the road edge as it passes your car, you'll be too far one side or the other.

A special game of "Pre-Flight" can be played with an unfamiliar car, called "Pre-Flight Familiarization." Score a couple of points for verifying the position of such controls as the horn, lights, wipers, heater and air conditioner, and all the gauges. Nothing is so unnerving as to stab at the center of the steering wheel, only to discover the horn is controlled from the turn signal stalk.

All of these "Road Games," if played correctly, will help keep you alert and aware of what you're doing. Surprisingly, you can win in all of these games even if you don't score them at all. Just playing is the important part.

drunk driving LAWS

The public anger about the injuries and deaths caused by drunk drivers has resulted in many new laws. These laws are written in terms that have very precise meanings but are not easy to understand if one is not a lawyer.

Presumptive Laws: In every state in the nation, it is illegal to drive while impaired by alcohol or drugs. But what does "impaired" mean? Laws say that a judge or jury can *presume* a driver was impaired if the amount of alcohol in the blood equals or exceeds an amount specified by the law.

Alcohol in the human system is measured in grams per 100 milliliters of blood, and stated in terms of percent of alcohol or weight per unit of volume. If there are .10 grams (10 milligrams) of alcohol in a 100 milliliter sample of blood, it would be expressed as .10 percent blood alcohol concentration (BAC). The BAC can be accurately measured by a breath, urine, or blood test.

State laws *presume* intoxication at a given BAC, usually .10 percent (.08 in some states). The driver's impairment is *presumed* if the BAC is at or higher than the legal limit. A high BAC, plus impaired driving behavior, is evidence of driving while intoxicated under presumptive laws.

Illegal Per Se Laws: Nineteen states have gone a step further than presumptive laws by making it *illegal per se* — illegal in and of itself — to drive with a specified BAC. A *per se* limit of .10 percent has been set in 18 states: Arizona, California, Connecticut, Delaware, Florida, Illinois, Maine, Minnesota, Missouri, Nebraska, New York, North Carolina, Oregon, South Dakota, Utah, Vermont, Washington, and Wisconsin. In one state, Iowa, the *illegal per se* limit is .13 percent.

In the 19 states, a properly administered test showing the driver's BAC to be at or above the legal limit is considered to be conclusive proof of drunk driving. No other evidence of driving impairment is required.

The *illegal per se* law provides prosecutors and defendants with an objective standard for assessing guilt or innocence and removes the need for subjective evaluations by police, judges, and juries. If the BAC is at or above the illegal *per se* limit, the driver is in violation of the law.

The constitutionality of *illegal per se* laws has been closely scrutinized and generally accepted. The Supreme Courts of Delaware and Utah have specifically upheld the constitutionality of their .10 percent BAC *illegal per se* statutes.

Per se legislation is pending in the District of Columbia, Louisiana, Michigan, and Ohio. The Oklahoma legislature recently passed a bill that administratively imposes automatic license suspension for a .10 percent BAC, regardless of the results of later prosecution.

Data supplied by Highway Users Federation
(current as of 1 June 1982)

PER SE AND PRESUMPTIVE DRUNK DRIVING LAWS

ALABAMA	Presumption at .10% BAC
ALASKA	Presumption at .10% BAC
ARIZONA	Illegal per se at .10% (enacted in '82)
ARKANSAS	Presumption at .10% BAC
CALIFORNIA	Illegal per se at .10% BAC
COLORADO	Presumption at .10% BAC
CONNECTICUT	Illegal per se at .10% BAC
DELAWARE	Illegal per se at .10% BAC
D.C.	Presumption at .10% (legislation pending to make per se)
FLORIDA	Both per se and presumptive statutes for .10% BAC (1982 legislation reduced to .08% - effective 7-1-82)
GEORGIA	Presumption at .10% BAC
HAWAII	Presumption at .10% BAC
IDAHO	Presumption at .08% BAC
ILLINOIS	Illegal per se at .10% BAC
INDIANA	.05% to .10% constitutes relevant evidence
IOWA	Illegal per se at .13% BAC; presumption at .10% BAC
KANSAS	Presumption at .10% BAC
KENTUCKY	Presumption at .10% BAC
LOUISIANA	Presumption at .10% BAC (legislation pending to make per se)
MAINE	Illegal per se at .10% BAC; from .06 to .09% is evidence of impairment
MARYLAND	Presumption of intoxication at .13% BAC; of impairment at .08% BAC
MASSACHUSETTS	Presumption at .10% BAC
MICHIGAN	Presumption of "under the influence" at .10% BAC; of impairment at .07% (legislation pending to make .10% per se)
MINNESOTA	Illegal per se at .10% BAC
MISSISSIPPI	Presumption at .10% BAC
MISSOURI	Both per se and presumption statutes for .10% BAC
MONTANA	Presumption at .10% BAC
NEBRASKA	Illegal per se at .10% BAC
NEVADA	Presumption at .10% BAC
NEW HAMPSHIRE	Presumption at .10% BAC
NEW JERSEY	Presumption at .10% BAC
NEW MEXICO	Presumption at .10% BAC
NEW YORK	Illegal per se at .10% BAC; lower levels may be evidence of impairment
NORTH CAROLINA	Illegal per se at .10% BAC
NORTH DAKOTA	Presumption at .10% BAC
OHIO	Presumption at .10% BAC (legislation pending to make .10% per se)
OKLAHOMA	Presumption at .10% BAC (legislation passed for automatic license suspension at .10%)
OREGON	Illegal per se at .10% BAC
PENNSYLVANIA	Presumption at .10% BAC
RHODE ISLAND	Presumption at .10% BAC (legislation pending to reduce presumption to .08%)
SOUTH CAROLINA	Presumption at .10% BAC
SOUTH DAKOTA	Both per se and presumption statutes for .10% BAC
TENNESSEE	Presumption at .10% BAC
TEXAS	Presumption at .10% BAC
UTAH	Presumption at .08%; illegal per se at .10% BAC
VERMONT	Both per se and presumption statutes for .10% BAC
VIRGINIA	Presumption at .10% BAC
WASHINGTON	Both per se and presumption statutes for .10% BAC
WEST VIRGINIA	Presumption at .10% BAC
WISCONSIN	Illegal per se at .10% BAC
WYOMING	Presumption at .10% BAC

safety's future?

1990

Think of three people you care very much about; include yourself to make the number four. Now realize that by 1990 three of these four people are going to be involved in traffic accidents. If the question is asked, "Who has a stake in the future of traffic safety research?" the answer should include *you*.

Researchers, federal transportation officials, insurance company representatives and engineers also have a stake in the future of traffic safety research — a stake that made the subject a principal theme at the SAE 1982 International Congress in Detroit earlier this year. During 11 half-day sessions, 43 technical papers and oral presentations related to such research. There was also a panel discussion dealing with crash-protection priorities and another on the future of traffic safety research.

Projections for future traffic safety research look like waves with swells every six to eight years. These waves will be ripples from a 61 percent increase in traffic deaths insurance companies are forecasting by 1990.

Traffic mix will be one of the major factors contributing to the rise in deaths, according to the insurance industry. While cars will be getting smaller, trucks won't. In fact, trucks are now referred to as "trains on the highway." Additionally, there will be more and more trucks on the road. By 1990, almost one in every four vehicles will be a truck.

Another contributing factor is the age of the car fleet. During the '70s, the age of the average car increased 20 percent. That makes the cars we drive daily older — older cars with fewer safety features. Older cars that require more major repairs — repairs that aren't being done because of the costs.

And the back log of needed major repairs applies to more than cars; it also applies to the roads and bridges.

Insurance companies are also extremely concerned because 21 percent of the states have recently attempted to repeal the 55 mph speed limit.

If the insurance companies seem preoccupied with numbers, there is a reason. As one Department of Transportation (DOT) official said, "Data is the keystone to progress."

Insurance company representatives admit that the six to eight years between wave crests is going to make for a very long tunnel, but survival is possible. They recommend that researchers have shopping lists. And that they only select those projects where the results can be fully employed.

DOT officials at the Detroit SAE meeting agreed with insurance company representatives regarding the traffic safety research funding horizon: The jelly bean jar is empty.

However, the same DOT officials quickly pointed out that there is a frame work in which all transportation projects are contained. The four sides of the frame being:

- Inflation — Everybody should already know about it.
- Future Traffic Mix — The insurance companies made it clear.
- Lean Highway Miles — As we are all driving less we are really cutting down drastically on our highway miles, and therefore are exposing ourselves more to dangerous urban traffic.
- Population Changes — This includes the movement toward a more urban society as well as changes in various age groups.

Where federal officials once recognized 14 areas for traffic research there are now only five: police, emergency, alcohol, education and passive restraints. And those five areas are very closely structured by the four sides of the frame work.

Many people think that the 55 mph speed limit may have been a turning point in traffic safety research events. However, researchers think the national speed limit's effects were minimal. They feel that after the initial wave crest there just hasn't been much technology advanced. As one university professor put it, "It's hard to re-invent the wheel."

For most of us, traffic safety research means crash testing. We think of crash survivability, passive restraints, front ends designed for pedestrian accidents, five-mph bumpers and the Research Safety Vehicles (RSVs). We know about side impacts, energy-absorbing steering systems, realistic dummies and computer simulation models.

But what most researchers want to know is when *we* are going to deemphasize crash survivability and get on with the study of accident avoidance. As the professor who com-

1990

Future traffic safety research involves more than just crash survivability such as emphasized in this Chrysler Cordoba de Oro interior. Accident avoidance and driver responsibility will be major focal points.

mented on technology said, "Drivers are a major part of the problem."

What are the problems facing traffic safety research from a researcher's point of view? Would you believe there are a dozen? They are:

- Alertness — including problems of alcohol and fatigue.
- Adverse Weather Conditions
- Prescription Drugs
- Visibility
- Perception Of Risk
- Road Signs
- Neglect — of both vehicles and roadways
- Crash Survivability
- Sensor Systems
- Testing
- Fuel Economy Versus Safety Trade-Offs
- Perception of Risk

That's right, the driver's perception of risk is such a big problem that it is listed twice! To top that, researchers have found that those people who have already had accidents are even tougher to handle when it comes to risk perception than those who have not been involved.

Perhaps the best solution to the risk perception problem is self testing: Self-testing such as the two-second following rule. But this also requires research to find out if drivers are even capable of answering such questions.

Looking at an individual problem you can see how really massive traffic safety research really is. Take visibility for example.

There is a great deal of concern about night vision. The question being what is more important: roadway marking or car recognition and lighting? Currently the feelings are that there is no compelling need to increase the headlight power on cars. At the same time there was nothing but praise for the German way of marking construction sites at night. This system, researchers feel, says "Don't hit me; follow me."

There have been all kinds of reports on the single, high-mounted brake light preventing rearend collisions. But additional studies have shown that this system is effective at low speeds only. It provided no additional protection in the 25 to 45 mph range. Additionally, researchers noted that the initial studies were based on vehicle damage reduction, not human injuries.

Another vision problem is that today's smaller cars are smaller targets in smaller outside rear-view mirrors. Yet putting larger mirrors on downsized vehicles can decrease fuel economy while using slightly convex mirrors may distort the driver's depth perception.

Of course you can't talk about traffic safety research without talking about safety belts. Rest assured that making the belts more comfortable and convenient is a priority with researchers.

Getting back into the "data is the keystone to progress" figures, insurance companies have already noted that restraint usage has decreased 50 percent from its peak. Similarly, DOT officials said that raising the belt usage rate one percent would save 172 lives every year.

However, before you start yelling for laws requiring safety belt usage, consider what one pioneer in traffic research said. "Can 'Smokey' get us to wear belts?" he asked before answering himself, "It is a moot point."

Likewise the problem of the drinking driver has to be faced. Especially when half the drivers involved in fatal accidents are drunk. And that figure is probably understated.

Yet DOT researchers don't think that problem is as simple as it sounds to most of us. "If you could take everybody off the road who has already been identified as a drinking driver," one DOT official noted, "there would be little or no effect on the accident and death rates involving drunk drivers."

The solution to the drunk driver problem is one of education. Education to deter the public from drinking and driving. To deter young drivers from drinking and driving. And this type of education requires research to find out what may work and what may not.

As one traffic safety researcher said, paraphrasing a chemical researcher, "You've got to see what everybody else has seen and then think what nobody else has thought."

Now think of those four people — including yourself — that you thought of when you started reading: Are they going to survive until the next wave crests? Are you?

SMALL VS. LARGE (AGAIN)

An article in DRIVER reporting that you are twice as likely to die in a crash when riding in the smallest cars as in the largest cars brought us a number of letters asking if the bottom line wasn't actually that there are more small cars on the road. Let's try it one more time:

In cars one to five years old, there were 1.6 occupant deaths per 10,000 registered full-size cars and 3.5 deaths per 10,000 registered subcompacts. Full-size cars are those with wheelbases greater than 120 inches; subcompacts have wheelbases of 96 inches or less.

There are currently no high-production cars with wheelbases of 120 inches or longer. Sales of automobiles with wheelbases of 96 inches or less are increasing. Does this mean that deaths in subcompacts will be fewer when there are no more big cars left on the road to tangle with the little ones? The insurance companies don't think so. They project that the problem of small-car fatalities will grow as more small cars take to the road. They recommend seat-belt use, anti-ejection modifications, steering-column improvements, and anti-laceration windshields to reduce small-car risk.

PRECIOUS METAL MINE

The outlook in recycling is brighter.

The automobile, itself the product of many different materials, must now be regarded as a significant source of highly precious, strategic metals. As a matter of fact, U.S. auto owners are today "literally sitting on approximately 2,000,000 ounces of platinum and 1,000,000 ounces of palladium which, at current precious metal prices, is valued at one billion dollars." So claimed Sebastian P. Musco, of Gemini Industries, Inc. The key to these resources is the catalytic converter used to control the emissions of current gasoline engines.

In addition to their immediate economic value, the metals have significant strategic importance as well. Musco noted that "the successful recovery and recycling of the platinum group metals from auto catalyst and converters will play an important part in the future availability and prices of these metals. Eighty-eight percent of the platinum group metals are imported from South Africa and Russia."

Musco pointed out that the U.S., which produces little platinum group metals, "now has a platinum mine from coast to coast, above ground, in automotive catalytic converters. The recovery of platinum group metals from automotive converters will make the U.S. the fourth largest producer of platinum in the world."

Almost nothing has been done regarding the vast potential represented by the metals in the millions of catalytic converters across the United States. However, we cannot ignore much longer the promise of this ever-growing "mine." According to Joseph E. Hunter, of General Motors Research Laboratories, "very little has been lost to date by not having an effective precious metal recovery and recycling system in place in the U.S. However, without such a system, significant losses will occur in the next few years."

EXPANDED NHTSA HOT LINE PROGRAM A SUCCESS

A caller from Montana asked for information on automobile fuel economy ratings and automobile crash tests. A request from California was for information on child safety seats, while vehicle maintenance was on the mind of a caller from Louisiana.

In each case, and in thousands of others, callers from all parts of the country were taking advantage of a new consumer tool implemented by the Department of Transportation, an expanded toll-free telephone service that allowed them to ask for a wealth of consumer and safety related information about automobiles.

The program, managed by the Department's National Highway Traffic Safety Administration, successfully handled nearly 42,000 calls since its expansion three months ago. The Hotline averages 650 consumer calls per day, and has serviced as many as 1,700 in one day. NHTSA staff members routinely meet requests for consumer information within 24 hours of receiving an order for brochures and publications.

The Hotline program is one of several efforts by NHTSA designed to better inform motorists of auto safety facts. On April 13, the White House announced the official kickoff of two major programs to deal with the public health problem of traffic accidents, deaths and injuries. One program is aimed at finding solutions to the drunk driving menace and the other is geared to preventing injuries and saving lives by increasing safety belt use.

The Hotline permits consumers to call free for safety-related recall information about automobiles, as well as general auto safety information.

A single telephone call can bring information on auto recalls, fuel economy ratings, crash tests results, uniform tire quality grading ratings, bibliographies identifying magazine articles on specific makes and models of various cars, the costs of operating various vehicles, and a listing of various publications consumers can order from NHTSA.

The agency's toll-free Hotline number is 800-424-9393 (426-0123 in the Washington, D.C. metropolitan area).

55 MPH

More than 25 million new drivers have been licensed since the 55 mph national speed limit was established in 1973. These drivers are not experienced in driving a vehicle at higher speeds. Most of them are in younger age groups, not old enough to have driven before 1973. Drivers under 25 are currently involved in about 37 percent of all fatal traffic accidents. Would repeal of the national speed limit put younger Americans in greater jeopardy? This is just one of many questions legislators have been asked to consider before deciding to raise speed limits.

Would You BELIEVE...?

This truck blew a tire, hit a guardrail and then went airborne, landing on its top. Two airmen were inside, both buckled in with seatbelts and shoulder harnesses. The passenger was injured. He unbuckled his seatbelt while they were upside down and he fell onto some broken glass. Nine stitches closed the cut in his head.

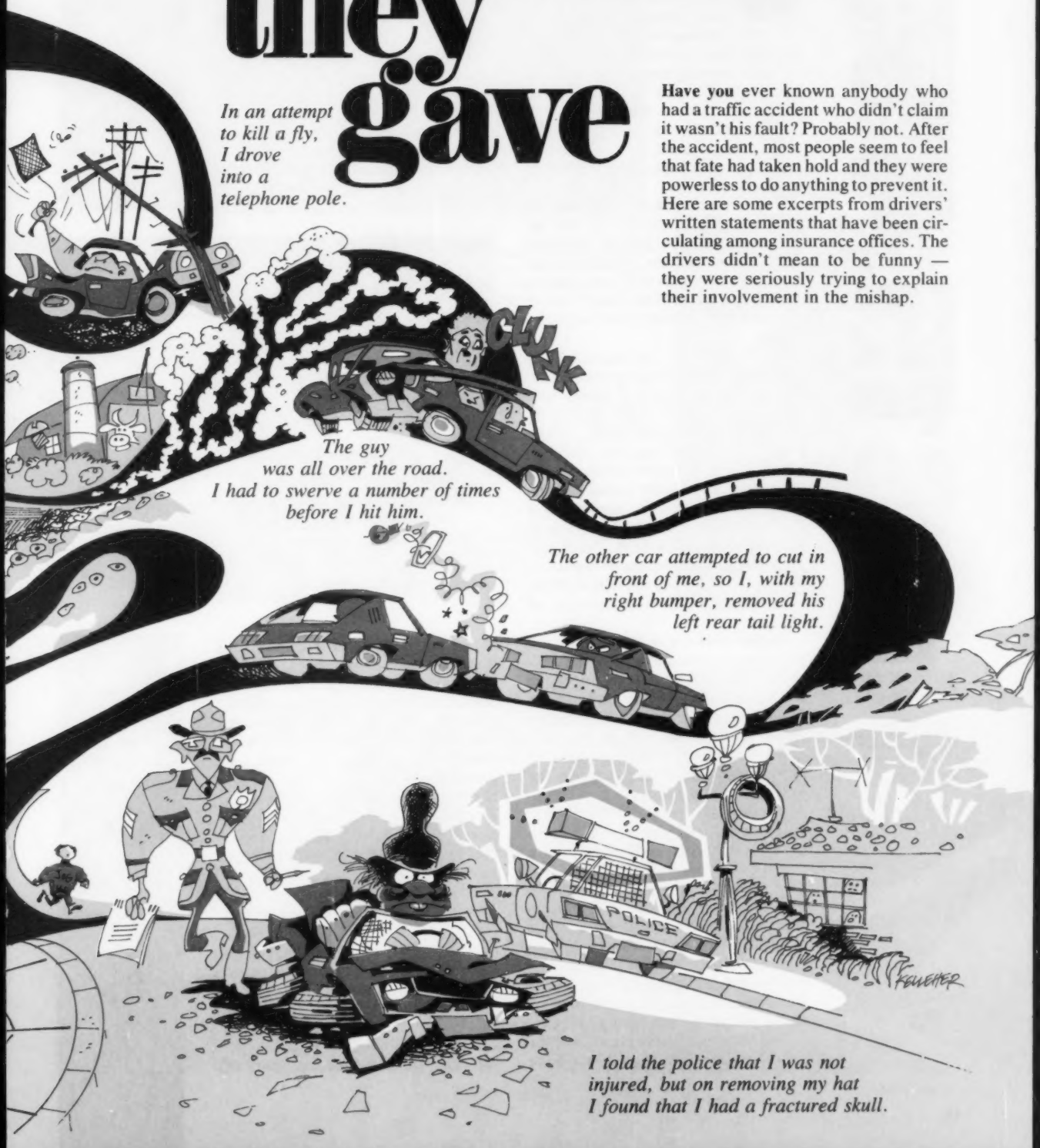
Once again:

make it Click

A pedestrian hit me and then dived under my car.
Coming home, I drove into the wrong house and collided with a tree I don't have.
The cause of this accident was a little guy in a small car with a big mouth.
An invisible car came out of nowhere, struck my vehicle and vanished.
POOF
The pedestrian had no idea which direction to go, so I ran over him.
STOP
SCREECH!
A stop sign suddenly appeared where no stop sign had ever appeared before.
I saw the slow-moving, sad-faced old gentleman as he bounced off the hood of my car.
Oops
BEND!
My car was legally parked as it backed into the other vehicle.

Reasons they gave

Have you ever known anybody who had a traffic accident who didn't claim it wasn't his fault? Probably not. After the accident, most people seem to feel that fate had taken hold and they were powerless to do anything to prevent it. Here are some excerpts from drivers' written statements that have been circulating among insurance offices. The drivers didn't mean to be funny — they were seriously trying to explain their involvement in the mishap.



In an attempt to kill a fly, I drove into a telephone pole.

The guy was all over the road. I had to swerve a number of times before I hit him.

The other car attempted to cut in front of me, so I, with my right bumper, removed his left rear tail light.

I told the police that I was not injured, but on removing my hat I found that I had a fractured skull.

the $15,455 difference

When shopping for a car, racers look for some of the same things you do when you look for personal transportation: dependability, purchase price, quality workmanship and safety. Racers don't normally expect fuel-efficient, front-wheel-drive sedans to meet these requirements. However, you do — well at least until you get to safety you can expect the small cars to fill the bill.

Yet sub-compacts do make the grade when constructed for the International Motor Sports Association's (IMSA) new ProFormance category. And as with any racing machine, if the vehicle doesn't get an "A" in safety it doesn't participate — period.

When you shop for dependability and quality workmanship you rely on written reports, word of mouth and what you see first hand. Racers do pretty much the same thing, "shopping" from those race car builders who have good reputations. In the case of IMSA RS (for racing sedans) competition, which includes the new ProFormance cars, Amos Johnson of Raleigh, N.C., has built about half the vehicles that won races in the last decade. That should speak well of the dependability and workmanship of his cars.

Owner surveys indicate that purchase price is second only to dependability on personal transportation shopping lists. This is where the fuel-efficient, front-wheel-drive cars shine since more are priced well under the $10,000 Americans paid for an "average" car last year. In the case of the Mazda GLC Sport hatchback that Johnson converts to a racer, it lists for about $6,545 complete with five-speed transmission and tons of trim.

However, before a racer rolls a ProFormance GLC out of Johnson's shop $22,000 must exchange hands — $25,000 if the racer wants a model with endurance-style brakes. That's not much in a league where price tags have been known to go as high as half-a-million dollars for a single car.

The third most important attribute personal transportation must have doesn't rate as far as most racers are concerned: fuel economy. The EPA rates the "Glick" at 35 mpg city, 46 mpg highway, 39 mpg combined.

That brings buyers — you and the racers — to safety, again. A widely publicized report by the Insurance Institute for Highway Safety indicates that occupants of several small Japanese cars — such as the GLC — are more likely to be injured or killed in an accident than occupants of domestic built automobiles.

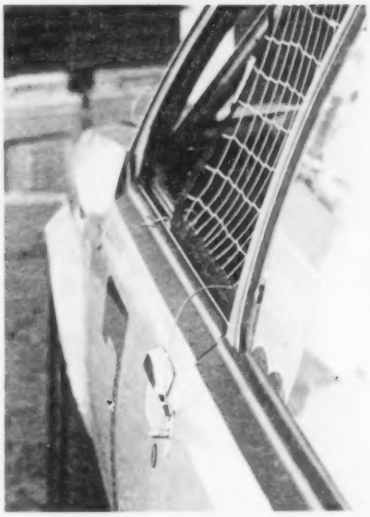
"Import owners believe that the driver has more control over safety," says Dr. John Hemphill, executive vice president of J.D. Power & Associates. The Power firm just completed a survey regarding the marketability of safety as a car feature. Dr. Hemphill says import car owners believe "that seat belts are more important factors for driver and passenger safety than do domestic car owners." A little over half of import owners say they always or frequently wear belts.

On the other side of the coin, racers also believe in belts and won't get into any car — racer or street machine — without buckling up. At the same time, a racer wants all the safety devices possible built into competition vehicles. And, as you can see, Johnson does just that.

(left, above)
The difference between the GLC economy hatchback (left) and the GLC ProFormance racer is not just miles per gallon and $15,455, it is a lot of safety features.

(right)
A race car is more than numbers on the door and advertising decals. For example, there is an extra safety pin to keep the door from flying open in event of an accident. There's also a window safety net to protect the driver's helmeted head. Also, note the lack of outside rearview mirror and the extra sturdy portion of the roll cage inside.

(below)
Open the door of both GLCs and you'll find the same interior that is completely different. Of special note are the racing seat and the rollcage structure that goes through the door opening and under the dash.



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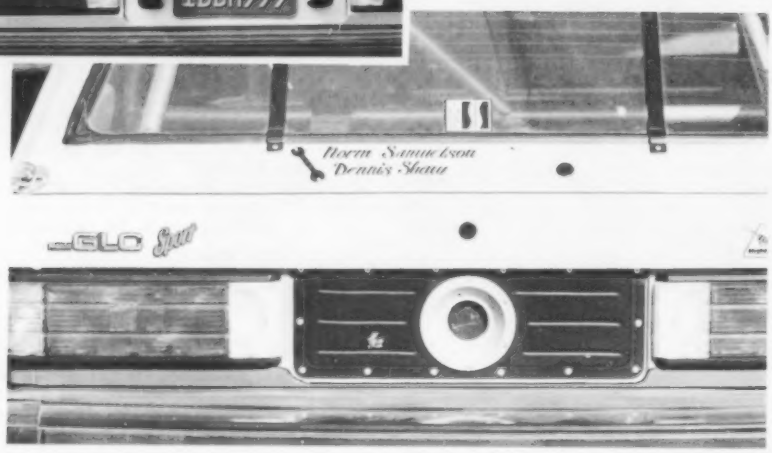
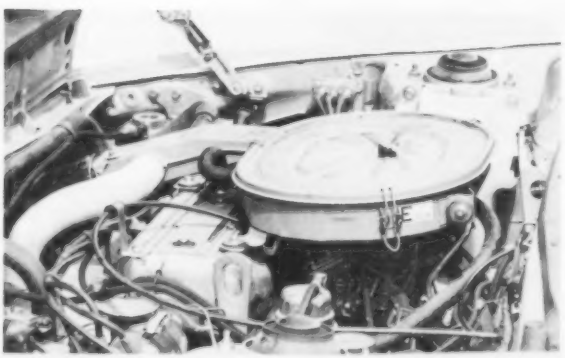
continued

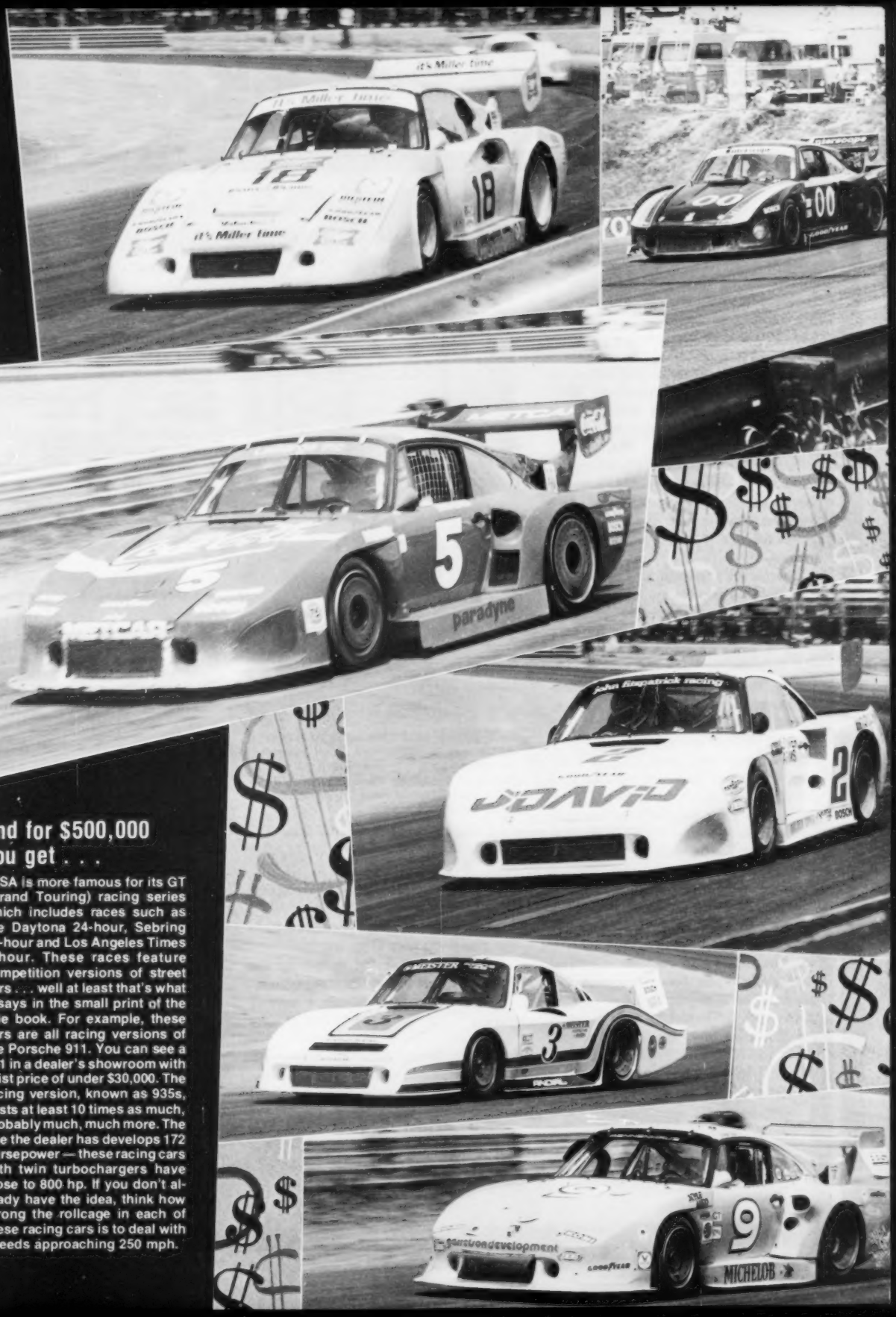
The back side of the racing GLC (which is all the driver hopes the competition ever sees) includes other safety features. The rear window is held in with safety straps. There is also a special "dry break" fueling inlet feeding a gasoline fuel cell — all to avoid spilling the volatile liquid.



The racing version "Glick" even has safety clips on the windshield to keep it in place.



Of course the heart of any racing machine is the engine with its myriad internal modifications (within the rules, for sure). But notice all the extra bracing built into the racer's engine bay for additional safety support.



and for $500,000 you get . . .

IMSA is more famous for its GT (Grand Touring) racing series which includes races such as the Daytona 24-hour, Sebring 12-hour and Los Angeles Times 6-hour. These races feature competition versions of street cars . . . well at least that's what it says in the small print of the rule book. For example, these cars are all racing versions of the Porsche 911. You can see a 911 in a dealer's showroom with a list price of under $30,000. The racing version, known as 935s, costs at least 10 times as much, probably much, much more. The one the dealer has develops 172 horsepower — these racing cars with twin turbochargers have close to 800 hp. If you don't already have the idea, think how strong the rollcage in each of these racing cars is to deal with speeds approaching 250 mph.

the backyard mechanic back to basics

The principles are easy, it's the chain that's greasy

Maintaining a safe motorcycle protects you and others. Whether you actually do the work or have someone do it for you, understanding the basic principles of motorcycle maintenance will provide the background necessary to spot problems before they become disasters.

The first rule of good motorcycle maintenance is to know and follow all the owner's manual instructions. Read it cover to cover. The manufacturer knows exactly what is required to keep the bike running well. The manual tells you how to operate your cycle, maintain it, diagnose trouble, keep up the appearance and get service. It also provides tips on safe driving as well as useful time and money-saving advice.

The owner's manual is a part of the basic tool kit you always carry on your motorcycle. Most dealers have small road-side emergency tool kits for your bike. If you're making your own, the tool bag should have: 10x14mm, 17x 19mm, 9x12mm and 10x13mm open-end wrenches; a spark plug wrench; pliers; slotted screwdriver, and two sizes of Phillips screwdrivers.

Experience with your bike will tell you what spare parts are necessary to carry. If you don't have this experience, tap your dealer's or another owner's knowledge.

The best single tool in your home workshop will be a service manual for your make and model of bike. If your dealer can't sell you one, check out any of the national motorcycle magazines for ads from companies that do. You might also consider a general motorcycle repair book, provided you check to be sure your bike is covered in the specific model section. Even if you don't do your own maintenance, you'll find the service manual to be an excellent investment. Especially when it comes to trouble-shooting problems.

Tools necessary for basic Backyard Mechanic work include: combination wrenches, socket wrenches, assorted screwdrivers, pliers, feeler gauges, spark plug gauge, spark plug wrench, small hammer, plastic mallet and parts cleaning brush.

Emergency tool kits for small road-side repairs are available from most dealers. If you can figure a way to include your service manual in the kit, so much the better; however, you'll usually have to settle for the owner's manual instead.

There are also some specialized tools that you'll require. They are:

Flywheel puller for removing the flywheel to get to the ignition points;

Timing gauge; although a vernier scale will work, it's not as fast or easy to use;

Ignition gauge for those bikes with magneto systems that often require adjustments through narrow flywheel slots, and

Timing tester to tell when the breaker points are open. However, we'll tell you how to use a voltmeter or test light instead.

Other specialized tools that the serious mechanics will want to include: a hydrometer, multimeter or VOM, compression gauge, impact driver, and carburetor synchronizer (for multi-carburetored motors).

Let's not forget the expendable supplies. You'll need grease, oil, gasket cement, wiping rags and cleaning solvent. You should be able to get all these at the Exchange, local gas stations or auto parts stores. You can probably sneak a little distilled water for your battery out of the spouse's steam iron supply. A can of penetrating oil wouldn't be a bad idea either.

Before tackling any job large or small, read the entire section covering that job in the manual. Study it and have a good idea of what's involved before starting. You'd be surprised at the number of "tips" that would help in step 17 that are hidden in step 59. Also, have those specialized tools on hand *before* beginning the project.

It'll be easier to work on the bike if it is clean first. There are numerous specialized cleaners for washing engines and related parts. Simply brush or spray them on, let 'em set and rinse off with a garden hose. Use cleaning solvents only for oily or greasy parts. Gasoline's extreme fire hazard makes it a no-no as a cleaner. Besides, it's not cost-effective. And make sure your work area is well ventilated when using any solvent.

Start the tune-up by removing the spark plug(s), making sure to note which plug came from which cylinder on multicylinder engines. From a used spark plug a trained observer can tell much about engine condition and car-

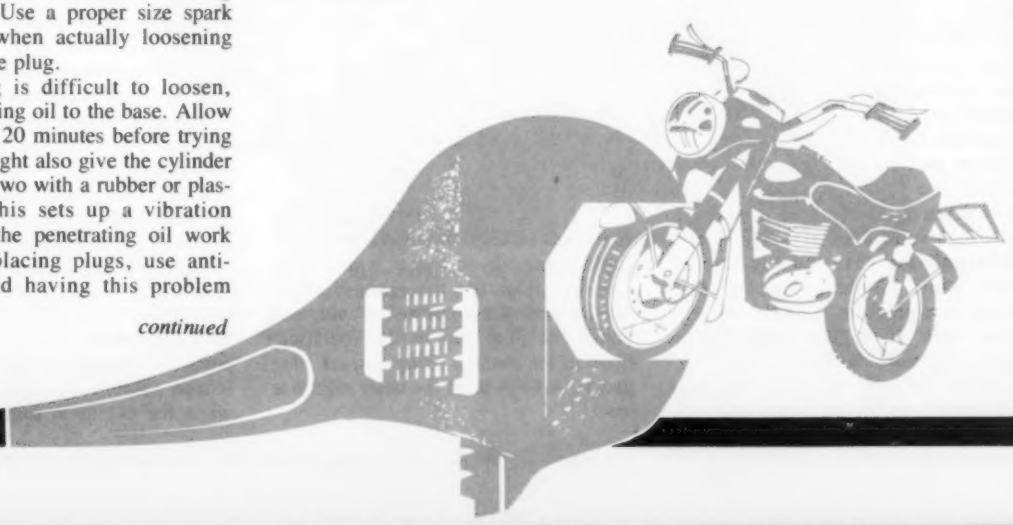
motorcycle maintenance

The best single tool in your home workshop is the $8.95 one in the top center of this picture—a service manual for your make and model bike. If some of these tools look unusual to you, you'd better find a knowledgeable friend before starting your own maintenance.

buretion. Before removing the plug, clean the area around the base to prevent dirt and other matter from entering the cylinder. Use a proper size spark plug socket when actually loosening and pulling the plug.

If the plug is difficult to loosen, apply penetrating oil to the base. Allow it to work for 20 minutes before trying again. You might also give the cylinder a light rap or two with a rubber or plastic mallet. This sets up a vibration which helps the penetrating oil work in. When replacing plugs, use anti-seize to avoid having this problem again.

continued



Various conditions are indicated by the removed plug. They include:

Normal – A light tan or gray deposit and no abnormal gap wear or erosion indicate good engine, carburetion and ignition.

Carbon Foul – Soft, dry sooty deposits are evidence of incomplete combustion usually attributed to rich carburetion. Other causes include weak ignition, retarded timing or low compression.

Oil Foul – Black insulator tip, damp oily film over firing end and carbon layer over entire nose may mean the spark plug is too cold (the wrong heat range). Other causes include:

Four-stroke engines; worn piston rings, worn valve guides or overfilled crankcase.

Two-stroke engines: Improper fuel/oil mixture, wrong oil, idle speed too slow, idle mixture too rich, clogged air filter, weak ignition, engine idling too long or oil pump out of adjustment.

Whisker Foul – Thin, hair-like material bridging gap indicates a dirty air filter.

Gap Bridging – Gaps shorted out by combustion chamber deposits fused between electrodes are caused by poor oil control in four-stroke engines. This can result from worn piston rings or valve guides, or maybe an overfilled crankcase. With the two-cycle power plant this may exist with improper fuel/oil mixture, clogged exhaust or misadjusted oil pump.

Overheated – Burned electrodes with light gray or chalk white insulator tips are exhibits of overheated plug. This is commonly caused by using a plug of the wrong heat range (too hot). If the plug is right, then other possible causes include lean fuel mixture, engine overloading or lugging, loose carburetor mounting or timing advanced too far.

Worn out – The electrodes are eroded. The plug's been in the corrosive gases of the combustion chamber under high voltage for too long.

Preignition – Melted electrodes and/or white insulator indicates sustained preignition. Check for the wrong heat range plug (too hot), or loose carburetor mounting.

Except for worn out, gap bridged, overheated or extreme preignition, spark plugs may be cleaned, regapped and returned to service. However, since spark plugs are relatively cheap and restoring old ones takes a lot of effort, such service may not be worth it.

safety first

- Never use gasoline as a cleaning solvent.
- Never smoke or use a torch near flammables such as cleaning solvent in open containers.
- Never smoke or use a torch near a charging battery.
- If welding or brazing on a machine, remove the fuel tank to at least 50 feet away.
- Use proper size wrenches for turning nuts.
- Think about your hand slipping when working with a tight nut.
- Keep the work area clean and uncluttered.
- Wear safety goggles when drilling, grinding or using a chisel.
- Never use worn tools.
- Keep a fire extinguisher rated for gasoline and electrical fires handy.

If you wish to use the old plugs, clean oily deposits off with a solvent and blow dry. Then give them a three- to five-second blast in a sandblast cleaner followed by an air blast to remove any particles left behind. Repeat the sandblast until the plug is clean. But remember that prolonged sandblasting will erode the insulator, making the plug easier to foul.

When the plug is clean, bend the side electrode up slightly and file the center electrode so that it is no longer rounded. Also file the rounded edges off the side electrode. Now you can adjust the plug gap to the specifications in the manual using a spark plug gauge. Always bend the outer electrode only.

Because it will be easier to turn the engine over for other service operations without the spark plugs installed, leave the plug servicing until just before starting the engine.

Immediately after you first remove the spark plugs and make observations about the engine's condition, a compression test should be made. After removing the plugs from a thoroughly warmed-up bike, screw or press (depending on the type of gauge) the compression gauge into the spark plug hole. With the ignition off, crank the engine briskly with the kickstarter several times. The gauge should indicate a pressure increase with each kick. Continue cranking until there are no more increases. Record the final reading. Of course, you must repeat the procedure with each cylinder.

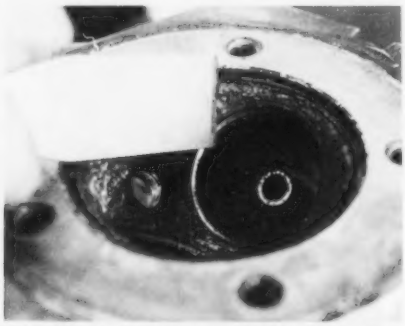
Because of many factors, no firm compression readings can be specified for any engine. However, a series of readings made under identical conditions over a period of time may reveal trouble long before serious symptoms are exhibited. A difference of 20 percent between successive readings for any one cylinder should be taken as an indication of trouble. Likewise, a difference of 20 percent between any two cylinders of a multicylinder machine also indicates trouble.

A drop in compression pressure could be caused by any one of many factors, most of which require major engine work.

To determine the cause on four-stroke engines, pour a spoonful of heavy engine oil through the spark plug opening, then hold the bike so that the affected cylinder is completely vertical. The oil will flow over the piston, temporarily sealing the rings. Repeat the compression test. If the compression is now approximately normal, you have worn piston rings and/or a worn or defective cylinder. In either case, the engine top end must be disassembled for repairs. However, it is more likely that the compression will not come up or does so only slightly. In this case, a leaking valve is usually at fault. Valve work, other than adjustment, is best left to the experts. A leaking cylinder head gasket is also possible. A rapid on-off squeal when the engine is running frequently

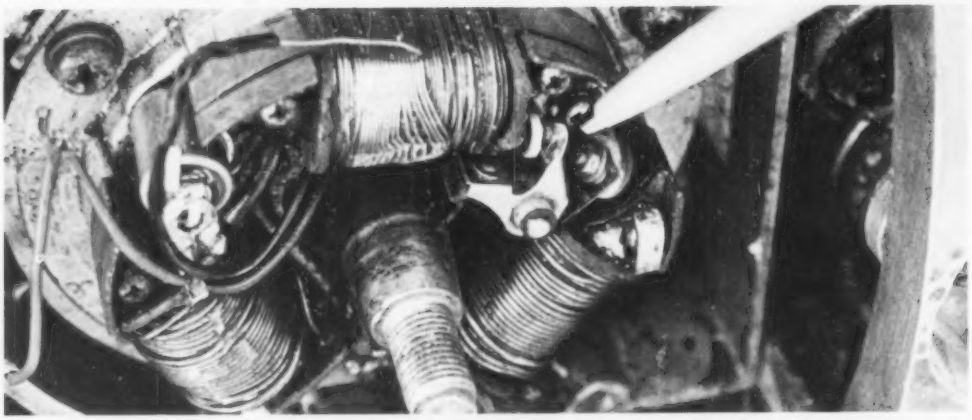
continued

Pressing the compression gauge into the spark plug hole, crank the engine over briskly until the pressure fails to increase. Record this reading and compare it with previous readings for that cylinder and other cylinders on multi-piston motors.

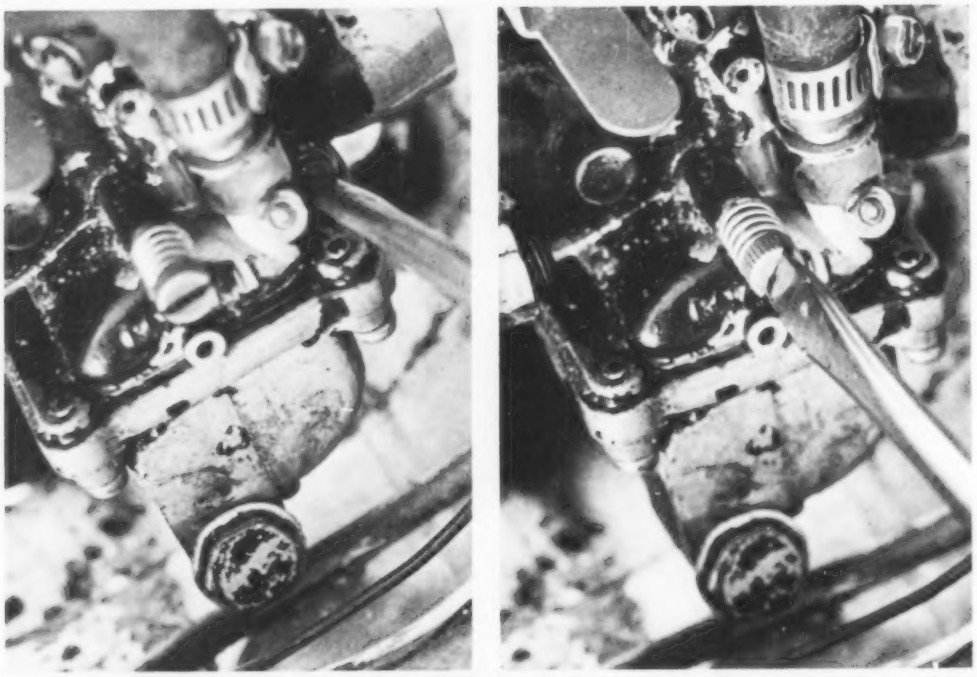


Carbon can be scraped off the cylinder head with a gasket scraper, such as this backyard mechanic is using, or the round end of a broken hacksaw blade.

When the tester (in the mechanic's left hand) indicates that the points have just opened, the dial gauge reads the distance below top dead center. If this doesn't match the manual specifications, the timing will have to be adjusted.



If you've never seen points on a motorcycle, automobile or any other gasoline engine before, they're what the ball point pen is pointing to.



To adjust the carburetor, turn the air screw (left) in until it seats lightly, then back it out 1¼ to 1½ turns. Then turn the idle speed screw (right) until the engine starts faltering. At this point turn the idle speed screw in the opposite direction until the engine runs smoothly. Repeat the idle speed screw turns once more before adjusting to obtain the desired idle speed.

accompanies this condition.

On two-strokes, the problems are simpler. Since there are no valves, and the cylinder and cylinder head must come off for carbon removal anyway, ring replacement is a simple job.

Two-cycle engines are particularly susceptible to carbon formation. Deposits form on the cylinder head, piston top and exhaust port. These can increase compression, causing overheating, pre-ignition, loss of power and severe motor damage.

To remove the carbon you must first remove the cylinder head, cylinder and piston. Consult the shop manual for exact procedures for each bike. Basically, what must be done includes:

1. Allow the engine to cool to avoid cylinder head warpage.

2. Remove the spark plug(s).

3. Using a criss-cross sequence, loosen each cylinder head nut half a turn at a time until each turns freely. This also minimizes warpage.

4. Lift the head off. If it sticks, tap it lightly with a rubber mallet. Don't pry it off because you may damage a sealing surface.

To remove the carbon from the head use the rounded end of a hacksaw blade as a scraper. Be very careful not to damage the sealing surface. Use the same tool for piston head carbon removal. After cleaning the top of the piston, clear the carbon and gum from the ring grooves with a ring groove cleaning tool or broken piston ring. Deposits left in the grooves will cause the rings to stick, resulting in a power loss.

Rings are easy to remove. Spread them apart with your thumb and index finger. Start with the top one and work your way down. When putting rings on a piston, be sure the notches engage the locating pins in the grooves. When replacing the cylinder, you'll have to compress each ring just as it enters the cylinder. A ring compressor tool makes the job easier, although a screw-type hose clamp works just as well. It is possible to compress the rings with your fingers making this simple job more of a challenge.

Scrape carbon deposits from the cylinder exhaust port with a blunt screwdriver.

To reinstall the cylinder head, reverse the removal procedures. Always use a new cylinder head gasket, unless the engine doesn't have one to begin with. Torque the nuts as specified in the manual. If the specifications aren't available, torque eight-millimeter nuts 15 foot-pounds and 10mm nuts 25 foot-pounds.

Normal use causes the breaker points to gradually burn and pit. As a result, points should be cleaned and regapped every 1,500 to 2,000 miles. If they aren't too pitted, they can be dressed with a few strokes of a clean point file and all the residue removed with lacquer thinner. Don't use emery cloth or sandpaper because particles can remain and cause arcing and burning. If a few strokes of the file don't smooth the points completely, replace them. Close the cleaned points on a piece of clean white paper such as a business card and continue to pull the card through them until no discoloration or residue remains on the card. Finally, rotate the engine observing the points. If they don't meet squarely, replace them.

Although you should consult your manual, you generally get to the points by first removing the gearshift lever. Then take off the crankcase cover (an impact driver makes this job easier). Next remove the flywheel retaining nut and lockwasher. Screw the flywheel puller (usually left-hand thread) into the flywheel for its full depth before turning the puller screw clockwise to remove the flywheel. Disconnect the two point wires, then remove the attaching screw. Install the new points in the same position as those removed, then connect both wires, being sure that the terminals are clean and the connection tight. Tighten the points attaching screw only enough to keep the stationary member from slipping as it has to move so the points can be adjusted.

However, most magneto-sparked engines have to have the flywheel installed before adjustment is possible.

Typically, you rotate the flywheel until the points are open their widest. Then insert a screwdriver between both pry points, moving the stationary point to obtain the proper gap as measured with a feeler gauge. This is another specification obtained from the manual.

Any time the breaker points are serviced or replaced, the ignition timing should be adjusted. Too early a spark may result in engine damage, while overheating and power loss result from too late firing. Typical magneto-equipped engine timing procedures are:

1. To determine piston position, mount a dial gauge or timing gauge in the spark plug hole.

2. Turn the engine until the piston is at top dead center.

3. Connect an ohmmeter, buzzer or other continuity-determining device across the breaker points.

4. Turn the engine in the direction opposite normal rotation, lower the piston about ½-inch or 13mm. The engine turns in the same direction as the rear wheel on most bikes using gears for engine to clutch reduction.

continued

continuity tester

A convenient method for connecting a continuity tester across the breaker points involves disconnecting the wire from the points at the coil. Then connect one test lead to the disconnected wire and the other lead to ground.

If you don't have a continuity tester, there are a couple of methods available.

In one case, take a lead from one side of the breaker points to the battery. Take another lead from the other side of the points through a light bulb or buzzer to the other battery terminal. The light will go out or the buzzer stop when the points open.

The other method is for motorcycles with battery ignition. Connect a voltmeter or test lamp to the points and ground. With the ignition switch on, the voltmeter will indicate battery voltage or the test lamp will light when the points open.

On engines using a primary chain for reduction, turn opposite to the rear wheel rotation. If in doubt, remove the timing gauge, put the transmission in gear and push the bike forward noting the normal rotation of the engine.

5. Very slowly rotate the engine in its normal direction until your tester indicates the points have just opened.

6. Compare the dial gauge indication with the distance below top dead center listed in the tune-up manual.

If the points don't open as specified, an adjustment will be necessary. There are two methods to do this.

The simplest may be used if the points opened within 0.02 inch (0.5mm) of the specified distance. Set the piston at the proper distance below top dead center and adjust the stationary breaker point until the tester indicates that the points just open. Be sure to tighten the lock screw and recheck the adjustment. For most bikes, ignition systems operate satisfactorily if point gap is 0.012 to 0.018 inch (0.30 to 0.45mm).

If the ignition timing is still too far off to adjust by changing the gap, it will be necessary to move the magneto base. Readjust the point gap to the specified value. Remove the flywheel. Loosen the magneto mounting screws enough to be able to turn the base plate. If the points open at a distance greater than that specified, rotate the magneto base in the same direction as engine rotation to retard timing. On the other hand, if the piston was too close to top dead center when the points opened, turn the base opposite engine rotation to advance the timing. Tighten the mounting screws securely. Temporarily replace the flywheel and check the adjustment. Minor changes can be made by changing the gap as before.

The air cleaner should be cleaned or replaced during any tune-up. A clogged air filter causes an over-rich mixture, resulting in power loss and poor gas mileage. Two-stroke engines are very susceptible to damage from dirt entering through the carburetor. Make sure the air cleaner is not torn and fits so no dirt can get past the edges.

Tune-up time is also battery service time. Test the charge; if less than half charged (1.220 specific gravity), recharge. Add distilled water if needed. Clean the top. Also clean and tighten the terminals. If the headlight hasn't been getting brighter when the engine speeds up from an idle, it's past time to check the charging system. There are specifications in the manual for meter checking the battery and charging system of your bike.

starting checklist

Before starting any bike that's been worked on, check the following:

1. Engine oil supply
2. Transmission oil supply
3. Clutch oil supply
4. Clutch adjustment
5. Valve adjustment
6. Throttle cable adjustment
7. Drive chain adjustment
8. Engine mounting bolts
9. Ignition timing
10. Tire pressures

If your machine is going to sit for more than 30 days without being ridden, at least start it regularly, letting it run until the battery can take on a full charge again.

Carbon deposits collect in mufflers and exhaust pipes on two-stroke bikes, robbing the engine of power. To clean out the carbon, remove the baffle tube retaining screw from the rear of the muffler and pull the baffle tube out. Use a wire brush to clean all deposits from the tube. If they are too heavy, heat the tube, then rap it lightly against a solid object. Running a length of used chain through the exhaust pipe will usually rid it of carbon.

Periodic valve adjustments are necessary on four-cycle engines. Too little clearance results in poor performance and short valve life while too much causes noisy valves and the engine doesn't provide full power. Consult the manual for specifics about valve adjustments on your machine or have a mechanic perform this service.

In overcoming objections to the fuel/oil mixing for two-cycle engines, many manufacturers have developed oil injection systems. This separate engine-driven oil pump supplies lubricant and is controlled by engine speed and throttle position. This is another area where procedures for adjustment are covered in the manual. And while we're on the subject, there are many new synthetic oils available for your bike. However, a word of caution: many of these synthetics are concentrated, requiring a completely different ratio than your machine is set up for. For example, a 20-to-one ratio normally requires a quart of oil for every five gallons of gasoline, while the synthetic may require only a pint for every five gallons. Therefore, use oil designed specifically for the purpose you intend, and make doubly sure of the ratio.

Remove the fuel strainer from the petcock and clean it. Since many carburetors also have a fuel strainer at the inlet fitting, it should be cleaned in solvent and blown dry. Don't leave the fuel petcock open overnight since this floods the crankcase of two-strokes with raw gasoline, making them next to impossible to start.

Carburetor adjustments are the last engine step in maintenance since they cannot be done accurately unless all other adjustments are correct. Although you'll have to check your manual for specifics, the basic adjustments for a single cylinder bike are:

1. Turn the air screw in (clockwise) until it seats lightly, then back it out (counter clockwise) 1¼ to 1½ turns.

2. Run the machine until it is warmed up thoroughly.

3. Turn the idle speed screw until the engine starts faltering as it runs slower and slower.

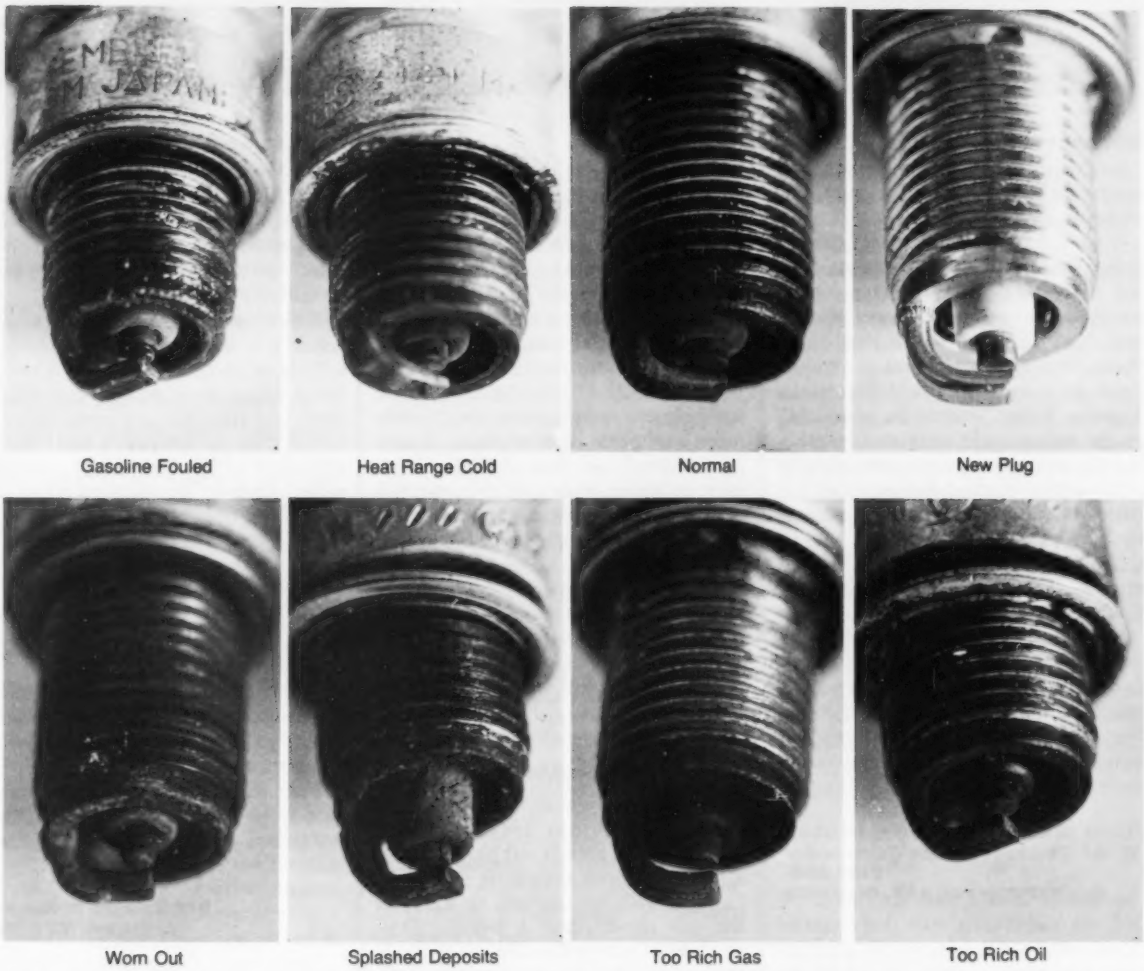
4. Then turn the screw in the opposite direction until it runs smoothly.

5. Repea. steps 3 and 4.

6. Adjust the idle speed screw to obtain the idle speed desired.

7. Ensure that there is a small amount of slack in the throttle cable when fully closed.

The engine is warm so now is as good a time as any to drain and refill the crankcase, transmission and clutch



Gasoline Fouled | Heat Range Cold | Normal | New Plug

Worn Out | Splashed Deposits | Too Rich Gas | Too Rich Oil

Spark plugs tell the story of engine condition and carburetion. We've indicated the condition under these plugs. Why don't you see if you can solve the problem with the information in the text? Most manuals provide similar pictures to help you diagnose problems. If yours doesn't, check with your parts counter sales representative because spark plug manufacturers may have supplied him with picture-related problem charts.

oil. Be sure you're using recommended grades and type lubricants. By all means don't use super lubricants in cycles that have common clutch and transmission oil supplies because they may cause clutch slippage.

You might think that you're ready to motor-motor . . . and you're right – at least as far as we're taking you this month. However, there is much more inspection to be completed on your bike before you're really ready to roll. Next month we'll dive into chassis service, and once you're on the road, troubleshooting. We certainly hope that you're the type who reads things through completely before starting work; otherwise we don't recommend riding that bike until you finish with the August DRIVER.

DRIVER wishes to thank Bob Amaral of Dale's Modern Cycle, San Bernardino, Calif., for his assistance in the preparation of this article.

BACKfire

LETTERS to the EDITOR

MOTORCYCLE MECHANICS

I sure enjoy those copies of your fine magazine that trickle up to my level — keep up the good work!

I've asked our safety officer to query you on back articles concerning motorcycle maintenance. I've never seen any (tho' I suspect you've had some). If you have published them, then releasing them as you've done in your "Backyard Mechanic Volume Series" would be beneficial to us motorcycle enthusiasts who would like to do our own simple maintenance. We have approximately 1,000 two-wheelers registered on Wright-Patterson and I'm having difficulty with providing a knowledgeable, skilled person through auto hobby shop programs and the basic what-to-look-for safety tips to our folks. A six-month novice, I find (next to flying airplanes) that mechanical safety of my machine is very important. I'd like to offer some educational program of some sort; perhaps you can help me.

Col Jay M. Strayer, USAF
Vice Commander
2750 ABW
Wright-Patterson, AFB, OH 45433

You asked for it, you got it: A Backyard Mechanic on Motorcycle Maintenance in this and August 1982 issues. However, a better solution to your problem is to check with local junior colleges to see what they have to offer in motorcycle maintenance classes.

OIL SLICK SPOTS

Being an active motorcycle rider for seven years now, I can appreciate your efforts on making the facts of riding stand out for those who still believe that you can jump on a bike and go.

I had my first spill in September of '81. I was doing around 25 mph leaving the barracks parking lot when my rear wheel caught an oil slick from a recent rain and I started sliding. Before I could get the slide under control, the wheel hit dry pavement. The sudden stop threw me from the vehicle, and I tumbled head over heels — so to speak — for about 25 to 30 feet.

In that spill, I broke my foot. I had my helmet on and came away with more hurt pride than anything. I was pretty shook up, but at least I was able to think about what happened and realize that this could have been on a busy street and double the speed I was doing. And I usually am very conscious of what is happening around me all the time. There's just no predicting. Riders beware.

Sgt T.W. Murphy, USA
Norfolk, VA 23511

A HOME FOR SQUIRRELS?

Great article about mothballing your car in the February 1982 DRIVER. One of my neighbors left her car with a friend without preparing the vehicle, but with instructions to start up the car about once a month. This must have warmed up the car enough to make a nice home for squirrels which nibbled on the cables and wires when food got scarce.

How about adding a few mothballs to "in and out of mothballs" by dropping a few in the corners under the hood and keep the varmints away?

Mr. Sidney Katz
Lakehurst, NH 08733

That's a good idea, but if you read "Double Tech" in the same February 1982 issue, you know that we are very adamant about how a car is to be warmed up and driven *when not used daily. Such care would probably also keep the squirrels out.*

BICYCLE ROAD TAX

I read with interest the letter in DRIVER written by MM3 Kelly regarding the fact that bicycle riders do not pay for the road on which they ride. You defended them. Well I hate to tell you, but you're wrong.

Your comparison of taxes and schools is incorrect in that you are talking of someone paying for something which they do not use. However, bicycle riders use something for which they do not pay. I feel that all bicyclists of age should pay road use taxes, perhaps in the form of a surcharge on the sale of the bicycle or tires or whatever. Maybe even a licensing system.

And, just to clarify my position, I am a bike rider. I confine my riding to bike trails and paths because as a motorist I am keenly aware of the stupidity and danger of trying to mix a 20-pound human-powered vehicle with 2,000-pound, 200-horsepower metal monsters.

Face it, bicycle riders cause us all money in increased taxes and road hazards. Let's tax them all, including me!

DAC Edward C. Handler
Arlington, VA 22203

SAVING ENERGY?

Where did we ever get the idea walking or bike riding saves energy for the USA?

When 10 cars follow a bike, usually in a lower gear, then finally get a chance to ACCELERATE rapidly and pass, how is any energy saved? How often does this occur for a two-mile bike ride?

The same is true of a pedestrian who holds up 20 cars as he lolligags across the street.

This is like trying to save energy in the winter by turning off lights. The furnace just runs a bit longer on its next cycle. In summer when you air

condition you can really save energy. Every dime's worth of energy you use in a house will usually cost about 20 cents more from your air conditioner.

John W. Ecklin
Alexandria, VA 22304

MANDATORY SEATBELT LAWS

The article published on "Mandatory Seatbelt Laws" in your February 1982 DRIVER Magazine is an innovative approach to an idea that has been discussed from time to time.

I suggest Major Zimmerman submit his idea to some bureaucratic lawmaker so he can claim credit for an idea that makes sense! Our duly elected officials seem to work much better and harder for a BILL that has their name on it.

SSgt James R. Foster Jr., USAF
Dover AFB, DE 19901

Major Zimmerman's idea is to tie the seatbelt requirement to auto insurance laws. If the driver isn't buckled up, he's guilty of contributory negligence and insurance reimbursement will be only half of what would be paid if belts had been used. If the insured doesn't like this rule, he/she may pay double the usual premium and still get full coverage.

VALUE OF SEATBELT USE

I read your magazine with enthusiasm whenever I can get hold of it. I've contemplated writing letters before, and as you can see I've finally done it. Here's why. I'm tired of hearing the comments from people on seatbelt usage; mainly, why don't we see articles on accidents where people have died while wearing seatbelts.

OK, readers, here goes! In most accidents having fatalities, where seatbelts were used, the severity of the impact involved or other factors would have made no difference on seatbelt usage. How do I know — I'm an E.M.T., I've seen it. You want a few true examples?

1. A volunteer fireman/EMT instructor, northbound on a two-lane highway. A southbound tractor-trailer crosses the center line. Attempts to avoid impact by the northbound driver were unsuccessful. A full head-on collision resulted. The northbound driver died instantly. Impact was so severe it took 45 minutes to free his mutilated body from the car. Seatbelts were used. Speed and weather not a factor.

2. Single vehicle accident. Driver lost control of vehicle on a bend. The left front of the vehicle contacted a large oak tree. Driver died enroute to the hospital. A chrome strip from the fender pierced his heart. Seatbelts were worn. Speed was correct for the road but too high for conditions.

Do you get the idea now? In most fatal accidents where seatbelts were worn, chances are the belt would not have made a difference. However, seatbelts do increase your chances of survival.

Remember: Clunk, click!!

TSgt James B. Brewer, Sr., USAF
APO New York 09179

SHEER MYTH

Your statement to Mr. Kelly in your March 1982 issue about interstate highways being a dangerous environment for bicyclists is sheer myth.

Do you really mean to say that it's safer for a person to ride a bicycle on a road with no shoulders and normal, dangerous intersections than on one with wide shoulders and virtually no intersections? There is plenty of evidence to prove you wrong. Also, Interstate highways are often the only reasonably direct route available (especially out west), as well as the only ones shown on most maps easily available to bicyclists.

Fortunately, California has recently opened several hundred miles of its rural freeways to bicyclists. Unfortunately though, most highway engineers persist in palming off the myth that it's very dangerous to ride a bicycle on roads with wide shoulders (i.e. Interstate highways) without any challenge.

You suffer from the "cyclist inferiority complex" — you seem to think that cars own the road and bicyclists don't really belong there, in spite of the law, (Mr. Kelly sounds like that type). Roads (and bicycles) were around before cars were invented. There's enough room for cars and bicycles alike to share when both are operated responsibly, predictably, and with maturity.

SSgt. Teresa M. Merrick, USAF
APO Miami, FL 34002

We aren't the ones who say freeways (interstates) are dangerous for bicyclists. That's the job of the state and federal traffic safety experts. California opened about a thousand miles of freeway shoulders in a few specified areas (rural) to bicyclists about seven years ago. The record for the first four years was good – fewer than 10 bicycle accidents. We'll check on it with the California Highway Patrol and report later on whether the program is still on and how it's doing.

Address your letters to:
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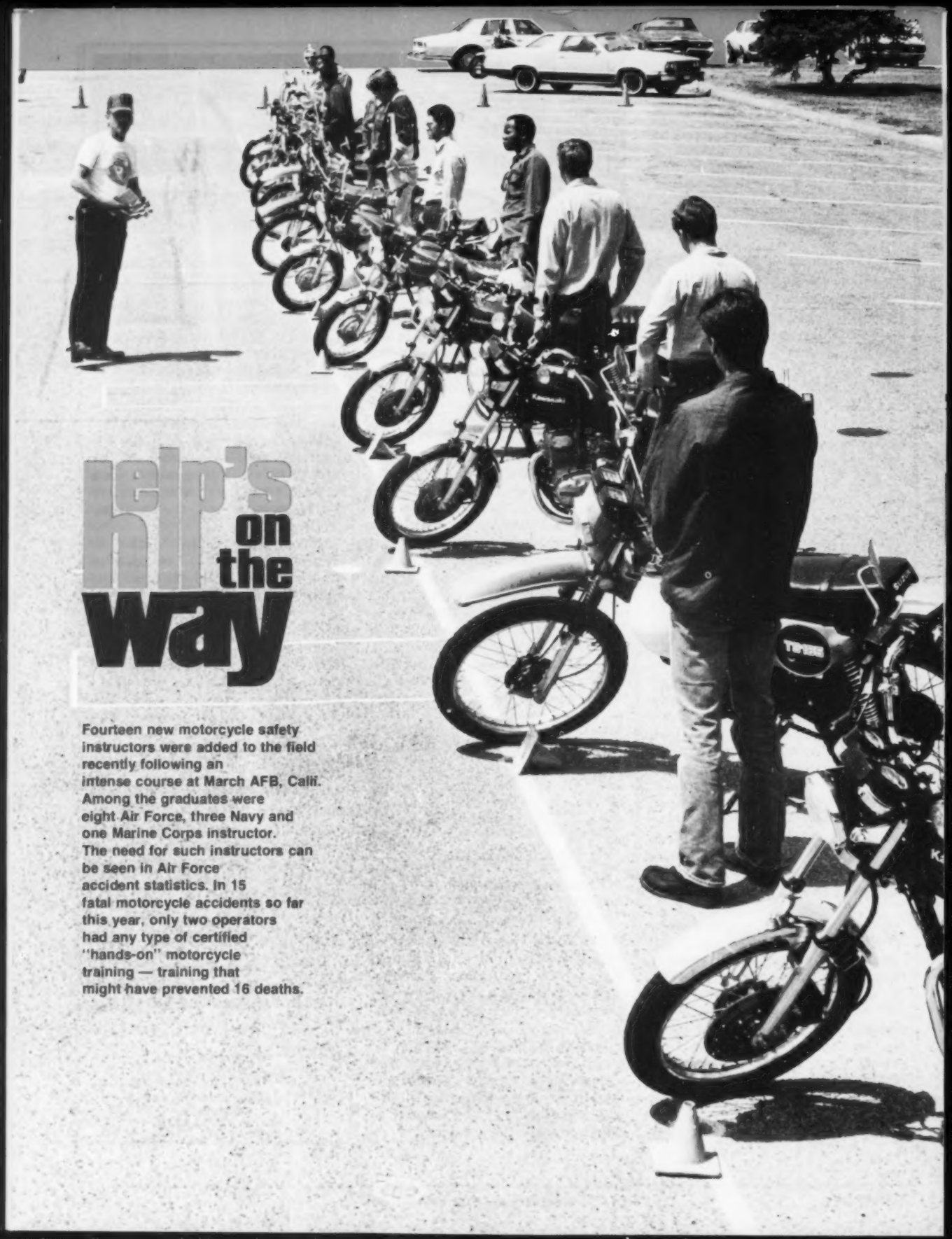

help's on the way

Fourteen new motorcycle safety instructors were added to the field recently following an intense course at March AFB, Calif. Among the graduates were eight Air Force, three Navy and one Marine Corps instructor. The need for such instructors can be seen in Air Force accident statistics. In 15 fatal motorcycle accidents so far this year, only two operators had any type of certified "hands-on" motorcycle training — training that might have prevented 16 deaths.